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REMOVAL OF AN ENORMOUS CALCULUS
FROM THE PELVIS OF THE KIDNEY
BY LUMBAR INCISION, WITH REMARKS.¹

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THE following case is of interest not only on account of the large size of the stone removed, but also because the question of the comparative merits of nephrotomy and nephrectomy is raised in such conditions of the kidney as existed in this case. The patient was sent to me by Dr. J. R. Johnston, of Spring Valley, Minnesota, with a letter stating he suspected the man was suffering from stone in the kidney.

The history of the case and condition on entrance I quote from the Hospital Report :

"W. C., aged twenty-six, was admitted into the Montreal General Hospital on the 18th of October, 1886, with a history of long-continued pain in the left lumbar region and pus in the urine.

"*History.*—Family and personal history good. Seven years ago he first noticed that small quantities of blood were passed in the urine at the end of micturition ; four years ago blood was mixed with the

¹ Read before the Montreal Medico-Chirurgical Society, March 25, 1887.

urine, giving it a smoky appearance. Has seen no blood in his urine for two years. During the last seven years he has been troubled with continuous pain, not always very severe, in the left loin, occasionally radiating downward to the crest of the ilium. He occasionally has periods of very severe pain lasting for some two or three weeks, after which he is comparatively well; of late years these periods of pain have not been so frequent, and when they do occur the pain is of a sickening character and causes morning vomiting. Sudden movement, as sneezing and coughing, brings on an attack of pain. Five years ago first noticed a whitish deposit in urine; up to a few months ago this was quite small in amount, and was passed with the morning urine. No history of renal colic.

"Present condition.—Is a fairly well nourished young man, of medium size, and with an anxious expression of countenance; complains of dull, aching pain in left lumbar region, and immediately below the last rib, in the axillary line, is a very tender spot the size of a twenty-five cent piece. He says the pain radiates from this point. Urine has a specific gravity of 1.015, and contains 15-25 per cent. of pus. Some days there is only a trace of pus. At other times there is as much as 25 per cent. Urea, $7\frac{1}{2}$ grains to an ounce. Amount of urine daily excreted, 40-50 ounces.

"By external examination no tumor or fulness can be detected on the left side."

On the 28th of October he was put under ether and the abdomen thoroughly examined by both Dr. George Ross and myself, but no tumor could be made out. The left loin was carefully explored with the long needle of an aspirator, but failed to reach either pus or a calculus. It was concluded

from the history of the case and the symptoms that a stone probably existed in the pelvis of the left kidney ; so, after consultation with my colleagues, I decided to cut down on the left kidney by lumbar incision, and explore it.

Operation.—October 30th, the patient being under ether, was placed on his right side, with a hard pillow under the right lumbar region, and a horizontal incision was made close below the last rib of the left side, commencing at the edge of the erector spinæ muscles, and extending downward and forward for some five to six inches. After dividing the muscles of the abdomen, the quadratus lumborum was reached, the lumbar fascia divided, and the kidney searched for ; the lower end was felt at a considerable depth, in fact, it could be barely reached with the fore and middle fingers of the right hand, so the opening in the loin was enlarged by an incision at right angles to the first, making the wound a crucial one. A long needle was introduced into the kidney and a calculus was immediately felt. The kidney being steadied by pressure from without, I made an incision down to the stone in the long axis of the organ, of some three inches. Through this incision an immense stone could be felt with the finger, but owing to its great fixity and large size it could not be dislodged. Whilst endeavoring to remove the stone, I accidentally ruptured a large artery, which ran to the lower end of the kidney, and was no doubt a supernumerary renal ; the hemorrhage was profuse, and I immediately introduced one hand into the wound, and so prevented further bleeding, whilst with the other I managed to catch the bleeding vessel with a pair of long artery forceps.

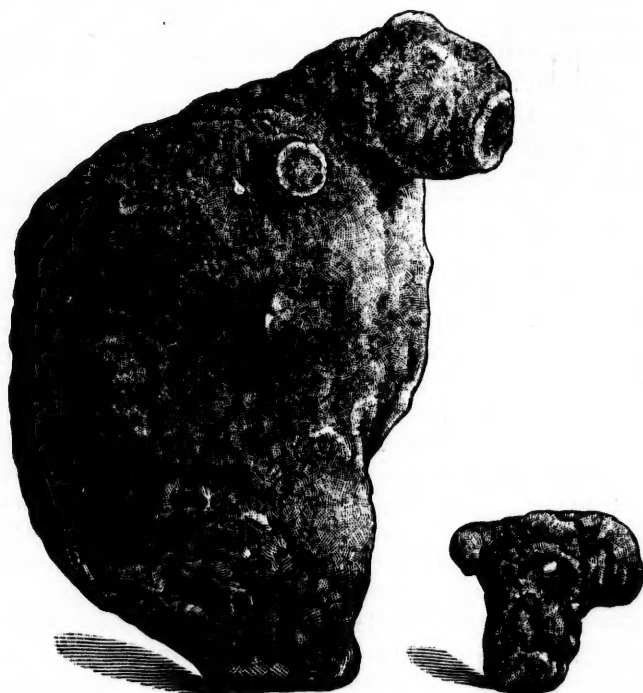
The stone proved too large to be grasped by a lithotrite, and too hard to be broken by a cutting

forceps. I attempted to break it with a chisel and mallet, but failed because of the difficulty of getting fixation of the kidney. The incision in the kidney was now further enlarged, and the stone gradually separated from the kidney tissue with the finger; even now, owing to the prolongations into the calices, the stone could not be removed. With considerable difficulty I managed to free the lower end of the stone which blocked the entrance of the ureter, and lifting it up, requested Dr. James Bell to grasp it with a pair of large lithotomy forceps; this was done, and the stone was brought away after the expenditure of considerable force. On examining the removed stone, it was seen that there were a couple of projections on it, one of which appeared to have been freshly broken off; so the hand was again introduced into the wound and a large fragment removed from a calyx; other smaller pieces were also removed. As the patient had been already an hour on the table, and was becoming weak from shock and loss of blood, no further exploration took place.

During the operation not a single drop of pus was seen; none apparently surrounded the stone, which was quite closely embraced by the surrounding kidney substance. So far as naked eye appearances went, the part of the kidney seen was perfectly healthy.

At one time I thought it would be necessary to remove the kidney, as it seemed impossible to remove the stone without it, but the very healthy appearance of the portion of the organ seen (the lower end), and the absence of pus, determined me to persevere, and, if possible, remove the stone and leave the kidney till the condition of the other could be ascertained. At no time during the oper-

ation could the kidney be brought to the surface, and the operation had to be performed by feeling more than by sight.



Side view, natural size.

After washing out the wound thoroughly with a 1 : 2000 solution of corrosive sublimate, and introducing a large drainage tube, the wound was brought together with silk sutures and dressed with sublimate jute pads. At the close of the operation the patient was in a fairly good condition, and did not show much evidence of shock ; and, although he

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had lost a considerable amount of blood, his pulse was full and strong, and not more than 80.

The weight of the removed stone and fragments immediately after the operation was 4 oz. 7 drachms. It measured $3\frac{1}{2}$ inches in length, and 9 inches in circumference, and consisted entirely of triple phosphate.

After the operation, which took place at 2 P.M., the patient did not pass any urine till noon next day, when he voided $7\frac{1}{2}$ oz. As there had been a great deal of oozing, the wound was dressed next day. Temperature 101° . Pulse 120. He still had vomiting from the ether.

Nov. 1. He passed 32 oz. of urine which was free from pus and blood.

For some time the patient progressed slowly toward recovery; his temperature ranged between 98° and 100° , and the amount of urine from 25 oz. to 50 oz. daily. The wound, which was not very sweet, and from which came large quantities of urine, gradually healed, and the tube was removed in the early part of December. He now began to have high and irregular temperature, with some sweating; from the 10th to the 25th of December his temperature ranged from 98° to 102° , and for several days after reached, in the afternoon, as high as 104° - 105° . Fearing that some collection of pus was forming about the kidney, I reopened the wound, introduced my fingers, and explored the pelvis of the kidney, but without result, except that a few flakes of calcareous matter were brought away. It was now decided to cut down and remove the kidney, but the patient quite unexpectedly took a turn for the better, and improved so much that, in the early part of January, he was able to go about the ward, enjoy his

meals, and gain flesh. The sinus in his right loin never healed, but continued to discharge large quantities of urine with a small amount of pus. At this time my service at the hospital having expired, I only saw my patient occasionally. His temperature was for several days quite normal, and then for a time would range as high as 101° . The amount of urine varied from 30 oz. to 40 oz. daily. I saw him early in February, going about, and apparently in fair condition. On the 10th of February he suddenly became jaundiced, his temperature rose to 102° , and he had severe sweatings. I saw him, and examined his side carefully, but could discover no evidence of any collection of pus about the wound, and the amount of urine reached 40 oz. daily. The fistulous opening in his side discharged urine freely, and a very small amount of pus stained the dressings. He gradually became worse, and died comatose on the 14th of February, three and a half months after the operation.

The autopsy was performed by Dr. Wyatt Johnston, pathologist to the hospital, and the following is taken from his report: "Body jaundiced. In left lumbar region a depressed cicatrix about two inches long is seen with a sinus toward the centre, from which fetid pus can be squeezed out. On opening the abdomen a large oval mass is seen in left lumbar and extending up into the left hypochondriac region. This mass has a quantity of fibrous exudation surrounding it and is very difficult to remove, being firmly attached to the lumbar muscles, spleen, and vault of the diaphragm. The retro-peritoneal glands are acutely swollen, but show no signs of suppuration. The aorta and vena cava are not directly involved in the mass and can be readily dissected off. Near the inferior extremity of kidney, two inches above the crest of the ilium, a small artery one and a half

inches long running directly from aorta to kidney, is seen; it is obliterated, apparently from a ligature. The fatty capsule of the kidney is densely infiltrated with fibrous tissue and cannot be removed without tearing the kidney substance; the left kidney itself is greatly enlarged and forms a fluctuating mass weighing nearly 1000 grammes. On opening the pelvis a little fetid pus escapes and the sinus in the loin is seen to open into it. On palpation a small calculus mass can be felt toward the cortex in one of the calices of the kidney, the calculus is the size of a hazelnut and appears to be broken off in one spot. It is enclosed in a small pocket of pus. The ureter immediately below the pelvis of the kidney is completely obstructed and its walls are much thickened. On incising the kidney along its convexity it is found to consist in the upper portion of a series of large communicating sacs containing over ten ounces of fetid pus. These cavities do not communicate with the sinus or the pelvis of the kidney, but are completely shut off from the rest of the kidney by thick fibrous walls, showing that the disease is of long standing. Within these sacs lie five or six irregular branched calculi, varying in size from a bean to a walnut. The lower fourth of the kidney contains a considerable quantity of healthy renal structure. Bladder and lower part of ureter normal. Right kidney double normal size and looks to be perfectly healthy. Liver shows numerous enlarged lymph glands lying beside the bile ducts, but bile can be easily expressed. Other organs healthy."

There is not the slightest doubt that this patient died of septicæmia due to the fetid abscesses in the upper end of the kidney. These could not be diagnosed by external manipulation, and from the fact that the part of the kidney seen at the opera-

tion was healthy in appearance and contained no pus, the condition of its upper end was not suspected.

So far as the operation itself went, it was successful, but one lesson may be learned from this case, viz.: that with a large stone in the pelvis it is almost impossible to have a kidney which has not undergone grave changes, and its thorough exploration by incision is indicated. Had there been pus around the stone and the kidney tissue not looked so healthy, I should have attempted to remove the kidney, but I had in my mind a specimen in the Museum of the Medical Faculty of McGill University, where the pelvis of each kidney, in a man, is filled by an enormous stone whilst the surrounding kidney structure is comparatively healthy and where there was not a drop of pus¹ or the sign of disorganization. In my case, however, although in the immediate neighborhood of the large calculus the kidney was healthy, yet the greater portion was composed of pus cavities containing stones unconnected with that in the pelvis.

The kidney was placed so deeply and situated so high up that, with even the very extensive lumbar incision which was made, it could not be properly explored, and I very much doubt if it could have been successfully removed by the loin. Its removal, owing to the numerous adhesions to important organs and its location, would have been a matter of serious difficulty, if not an impossibility, even by abdominal incision, for at the autopsy by the combined abdominal and lumbar incision it was only by cutting freely the surrounding parts that its excision was accomplished.

In such a case incising the kidney in every part, evacuating the pus, and removing the calculi would

¹ This case is reported by Dr. J. A. McDonald in vol. xii. of Canada Medical and Surgical Journal.

be the proper procedure. Diseased kidneys which enlarge downward are much easier to remove by lumbar and also abdominal incision, than those which enlarge upward and are wholly under cover of the ribs.

There is another point about this case which is worthy of notice and it is this: When a kidney is highly placed it may be enlarged so as to form a considerably sized tumor which cannot be detected by the most careful palpation even when the patient is placed under ether. The failure to find the stone by needle exploration, before the operation, was due to the same cause—the high position of the tumor and its great depth.

In connection with this case I might mention one reported by Prof. Guyon, of Paris,¹ which is very similar to the one narrated above. In Guyon's case, however, a distinct tumor could be felt externally. After cutting down on the tumor and incising it he found the pelvis of the kidney completely filled by an enormous stone with processes extending into the calices, these processes were cut off with forceps and the large calculus extracted with difficulty; after the removal of the smaller pieces, the pelvis of the kidney was explored with the finger and sound and no more stones could be felt. The patient died some two weeks after from hæmoptysis, and at the autopsy it was found that the kidney was so adherent to the surrounding parts that it probably could not have been extirpated. Several more stones were found in the upper end of the kidney in cavities separated from the pelvis by connective tissue. Prof. Guyon, in the course of his remarks on this case, states that here nephrotomy was preferable to nephrectomy, and that had the kidney been properly incised the other stones would have been

¹ La Semaine Médicale, Feb. 10, 1887.

found, that in such cases the kidney should be freely incised and every nook and cranny explored; he holds that if this were done in cases of calculous pyelitis nephrectomy would never be called for.

Formerly it was feared that free incision of the kidney would cause severe and dangerous hemorrhages, but experience has taught surgeons that the danger is an imaginary one, and that kidneys which are much disorganized may be incised without fear of bleeding, and that even in healthy kidneys the hemorrhage from incisions is easily and permanently controlled by pressure.

In such cases as the one above narrated, where the stone is of great size and the kidney is enlarged, the mere extraction of the stone in the pelvis should not satisfy the operator; he should thoroughly examine the kidney in every part by free incisions so as to be sure no calculus is left behind. External manipulation of the kidney is not sufficient to detect stone, and in such cases as my own, even exploration through the kidney pelvis would fail, without further incision, to detect calculi unconnected with that in the pelvis.

Up to a short time ago the largest stone removed by lumbar incision was under two ounces in weight. Lauenstein¹ reports a successful case of removal of a large calculus (weighing 25 grammes and composed of the triple phosphates) from the pelvis of the kidney. He had to break the stone with a lithotrite before he could extract it. In his paper he states that it was the largest stone removed up to that time, though not the heaviest. Three months after the operation the sinus in the loin had completely healed and when the article was written the patient was perfectly well.

¹ Archiv für klin. Chir., Bd. 34, Heft 1, 1886.

Dr. John Neill,¹ after relating a case of large renal calculus found after death, quotes from *Cyclop. Pract. Med.* the following case: "A remarkable instance of such calculus occurred in the person of a natural daughter of Sir Richard Steele. No nephritic symptoms took place until shortly before death, when severe pain was felt in the region of the right kidney, fever followed and speedily proved fatal. A calculus of oxalate of lime weighing $7\frac{1}{2}$ ounces was found in the right kidney which was so thin by absorption as to be reduced to a mere membrane. In this instance the stone could be felt, during life through the loins, inducing a belief that the kidney had become ossified (Catal. Museum of Royal Coll. Surg., London. Note by John Hunter)." In this case there was evidently but little suppuration, or the stone could not have been so easily recognized.

Mr. Victor Horsley² on Sept. 16, 1885, removed a stone weighing $2\frac{1}{4}$ ounces from the pelvis of the kidney of a middle aged woman; ten days after she was doing well. It was the largest stone removed from the kidney up to that time.

Mr. W. L. Brown³ reported a case before the Birmingham and Midland Counties Branch of the British Medical Association, in May last, where he had removed from the kidney by abdominal section a stone weighing 11 ounces. The kidney tumor occupied the right half of the abdomen and contained three pints of pus. The cut edges of the cyst were stitched to the abdominal walls and the cavity drained. The patient died suddenly eleven days after the operation from heart clot. So far as I know, the stone in my case is the largest ever removed by lumbar incision.

¹ American Journal of the Medical Sciences, July, 1849, p. 121.

² Brit. Med. Journ., Sept. 26, 1885.

³ Ibid., March 6, 1886.

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